DER Certification Laboratory Pilot, Accreditation Plan, and Interconnection Agreement Handbook

Subcontract Number: NAD-1-30605-13

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Electric Distribution Transformation Program

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Project Perspective

- **Objective** –
  - To create the needed organization, procedures, plans and tools that support certification of grid interconnection equipment and accreditation of test laboratories
  - To establish tools that support simplified interconnection agreements
- **Relevance** – Enable the addition of generation capacity, voltage support, and congestion relief by simplifying the evaluation and approval process required to effectively integrate distributed generation and storage resources.

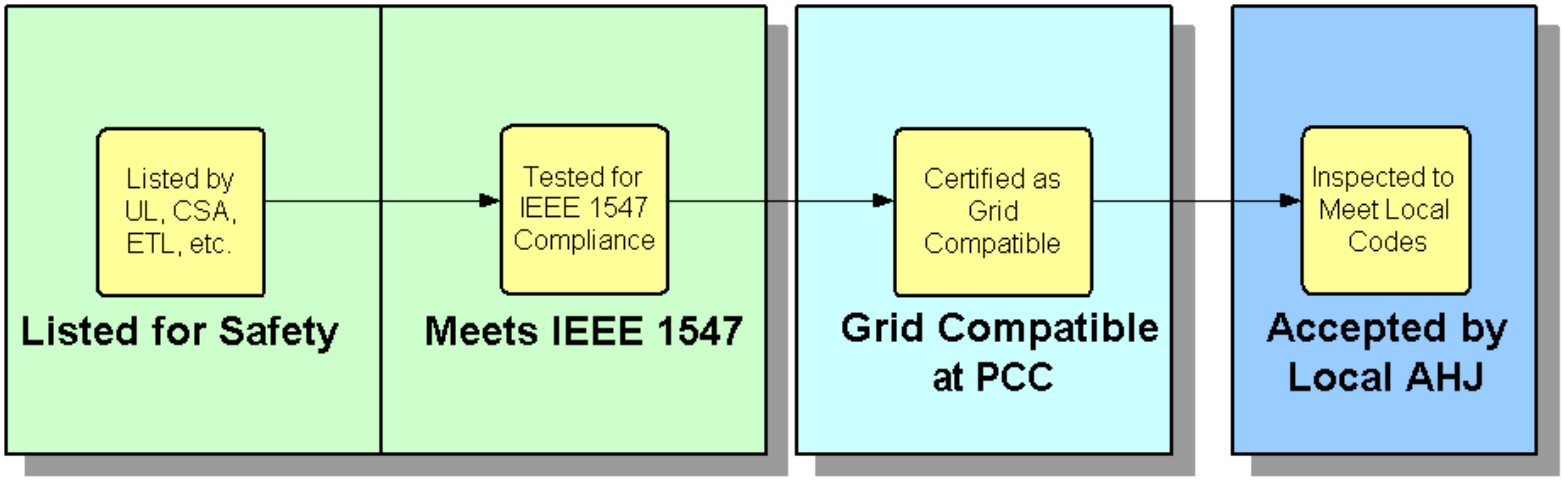
Technical Approach

- **Develop organization and draft a plan**
  - Modeled after existing plans, e.g. ANSI, OSHA's NRTL, and NREL's Certification and Accreditation Plan for PV Modules
- **Promote industry-wide consensus**
  - Organize stakeholders and create advisory board
  - Solicit stakeholder inputs on testing and reporting procedures
  - Develop standard test criteria with rationale and expected results
- **Demonstrate a certification and lab accreditation pilot**
  - Applicable to broad spectrum of grid interconnection equipment and stakeholder communities
  - Draft test protocols for two types of DG interconnection equipment
  - Conduct pilot testing to demonstrate the certification and accreditation model plan
- **Develop tools to support simplified interconnection agreements**
  - Test protocols for certification of grid interconnection equipment
  - Interconnection agreement handbook
  - Web-based resources and training
  - Organizational workshops
- **Identify and screen candidate laboratories for certification**

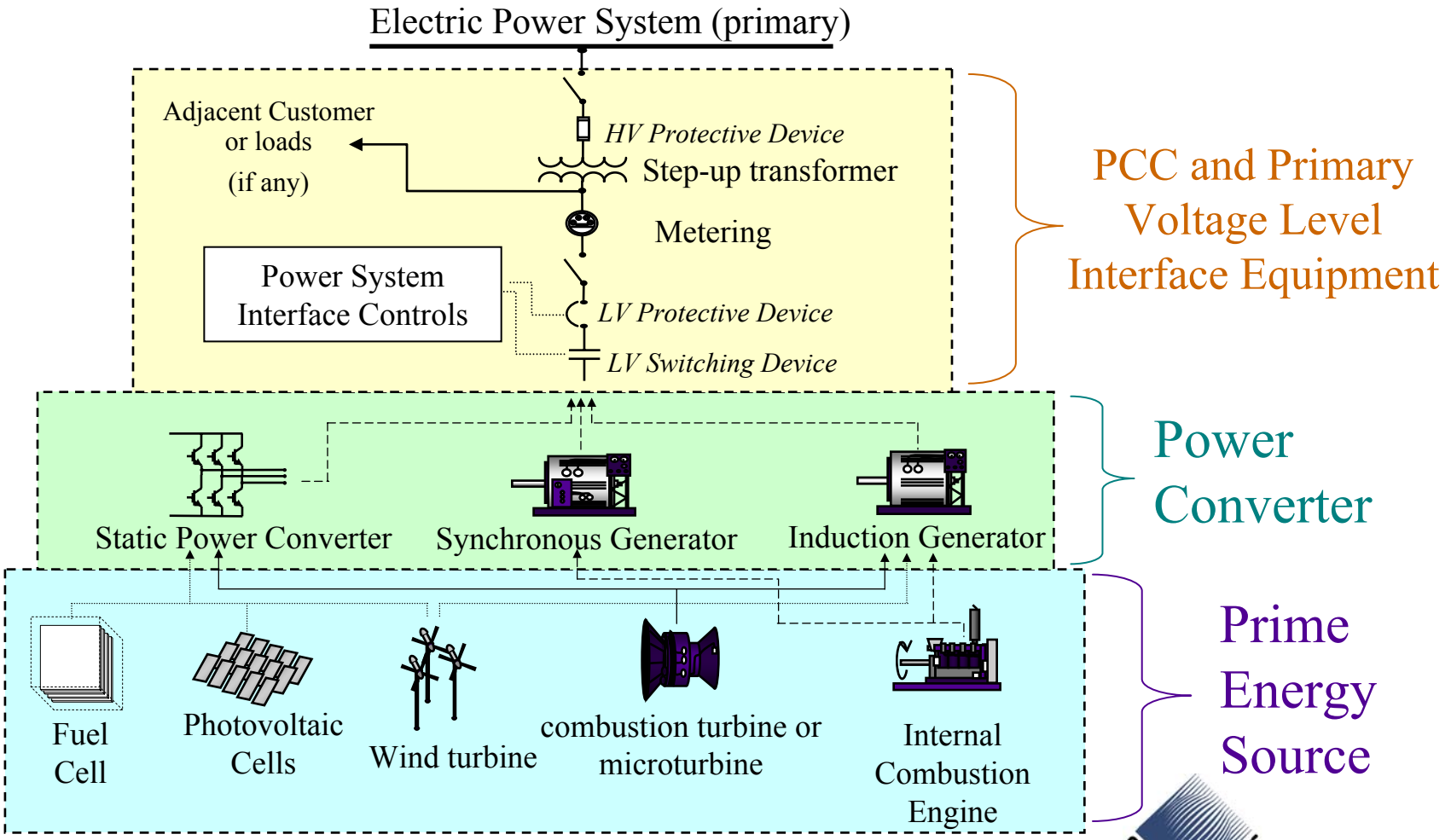
Base Period Progress and Accomplishments

- Engaged DER industry stakeholders
- Developed Preliminary Draft Certification and Accreditation Plan
- Reviewed State and Federal DER Interconnection Rules Agreements
- Planned Interconnection Agreement Handbook
- Created DER Interconnection Web Site (Beta)

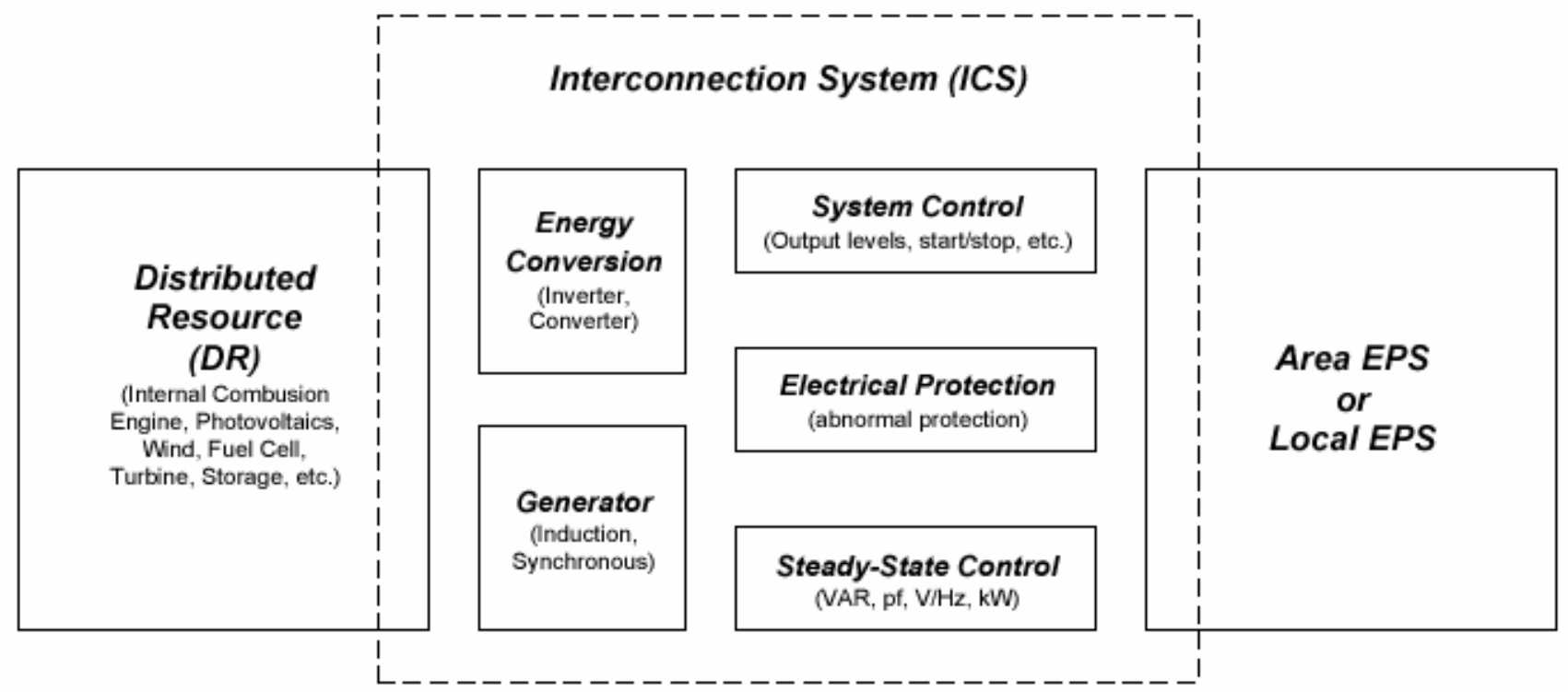
Conceptual Process for Certification of Interconnection Hardware



Levels of Equipment that Define a DER Site



IEEE1547.1 Defined the Interconnection System (ICS)

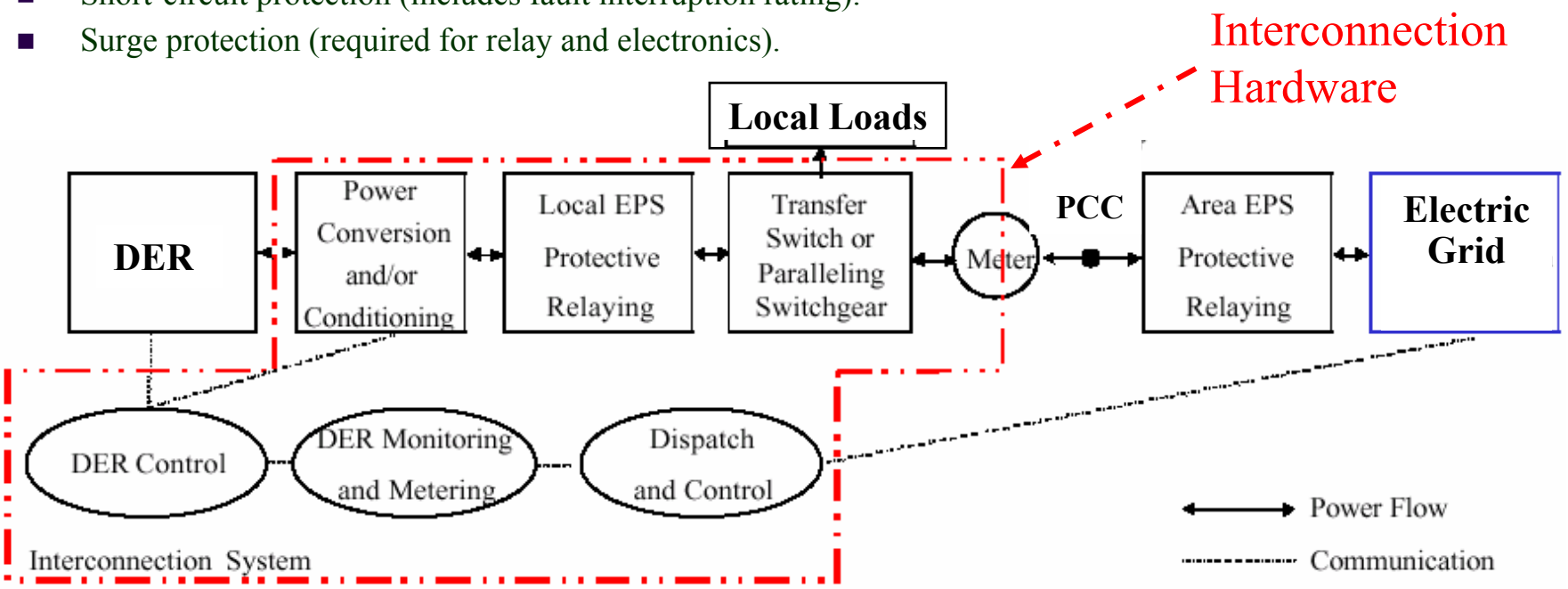


Definition of the installation and its content

Functions and Relative Location of Interconnection Hardware in DER

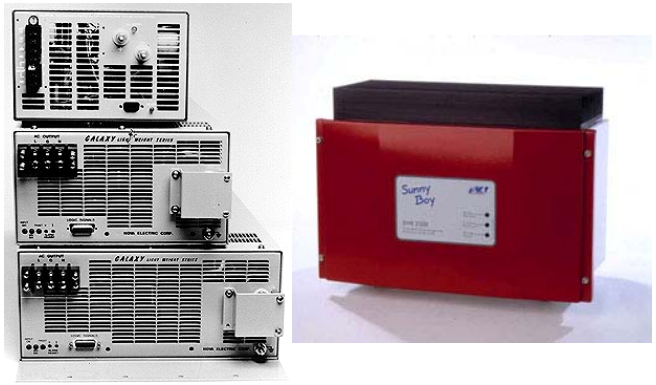
Basic Functions of Interconnection Hardware

- Electrical isolation via power transformer.
- Controlled connection and disconnection (includes a load-break contactor and paralleling control).
- Visible and secure (lockable) disconnect.
- Short-circuit protection (includes fault interruption rating).
- Surge protection (required for relay and electronics).



Ref. NREL/SR-560-32459 DER Interconnection Systems: Technology Review and Research Needs

Variety of Interconnection Hardware



Inverters

Multifunction Relays

Disconnect Switch

Paralleling Switchgear

Paralleling Control and Transfer Switches

Meter-base Interconnection

Certification Criteria are needed for both Inverter and Relay-Controlled Connection

Full-scale DER systems under test (controls are integrated in the Inverter)

OR

Multi-function relays from DER units

Standard relay tester (Omicron CMC 256-6 or equal)

Multi-function relays used in DER

Project Interactions and Collaborations

- Areas that need to be considered
  - State and Federal regulatory actions
  - Economics, costs vs. benefits
  - Availability of practical interconnection hardware
  - Quality, availability, and reliability
  - Education and training
- Organizations with Related Activities
  - Department of Energy, DPP interconnection projects
  - California Energy Commission PIER
  - New York, Texas, California and other states rules
  - EPRI and Utility Industry Interconnection Research
  - Other Private and Public Activities Research

Life-Cycle Project Timeline

Milestones/Deliverables

BASE PERIOD (Tasks 1 - 2)

- Engage Stakeholders
- Web-Based Resource Site (Beta)
- Discussion Draft Certification and Accreditation Plan
- Draft Labeling Criteria
- Interconnection Handbook Outline and Plan

OPTION PERIOD 1 (Tasks 3 - 5)

- Pilot Testing of Interconnection Equipment
- Report of Pilot Testing and Updated Web Site
- Final Draft Plan for Certification and Lab Accreditation
- Final Draft Interconnection Agreement Handbook

OPTION PERIOD 2 (Tasks 6 – 8)

- Draft Test Protocol for 2nd DG Equipment
- Conduct 2nd Pilot Testing to Demo Efficacy of Final Draft Model Plan for Certification and Accreditation
- Web-Based Interconnection Handbook
- Web-Based Training Courses
- Survey of Potential Certification Labs

Budgets

	Total ($k)	DOE/NREL ($k)	Subcontractor ($k)
Base Period (2001-2003)	$ 265	$ 147	$ 118
Option Period 1 (2003-2004)	$ 294	$ 163	$ 131
Option Period 2 (2004-2005)	$ 360	$ 200	$ 160
Total	$ 919	$ 510	$ 409

Impacts and Benefits

- Plans, procedures and tools for certification of DER interconnection equipment to reduce the complexity, time and cost of connecting DER to the grid
  - ***Utilities*** **will be able to provide their customers information on pre-certified DER systems which meet safety and performance standards.**
  - ***DER equipment manufacturers*** **will better understand key issues for developing compatible DER systems**
  - ***Professional service companies*** **will be able to determine future roles in DER market**
  - ***Critical DER component suppliers*** **will better understand industry needs**
  - ***Academia*** **will better identify and define courses and conduct more focused R&D projects**
  - ***Associations and standards-making bodies*** **will exchange information and avoid duplication of effort**

Planned Activities for FY04

- Pilot Testing & Report on Interconnection Equipment
- Update Certification Resources Web Site
- Finish Certification and Lab Accreditation Plans, identify various scenarios/paths to certification
- Finish Interconnection Agreement Handbook
- Obtain stakeholder input on all of above
- Other Reporting
  - Monthly and Annual Technical Progress Reports
  - Quarterly and Annual Peer Review Meetings

Current Events

- IEEE 1547 has been developed and approved… (1547.1 testing protocol, .2, .3 all underway)
- Several states have developed procedures for streamlining interconnection (CA rule 21, NY, TX, NARUC efforts)
- FERC is in final stages of setting rules "Standardization of Small Generator Interconnection Agreements and Procedures for interstate T&D" (NOPR RM02-12-000)
- Creation of OETD and Electric Distribution Transformation Program with new emphasis on grid support

Considerations going forward

- How to build certification process around IEEE 1547
  - Type, production, and commissioning tests of 1547.1
  - Component vs System Certification
  - Pre-existing hardware listings and performance certifications
- Utilities require location-specific checks at DER installation site…what is role of pre-certification or commissioning tests?
- Impact of FERC rules on distribution-level certification process.

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